FIG.1 PRIOR ART

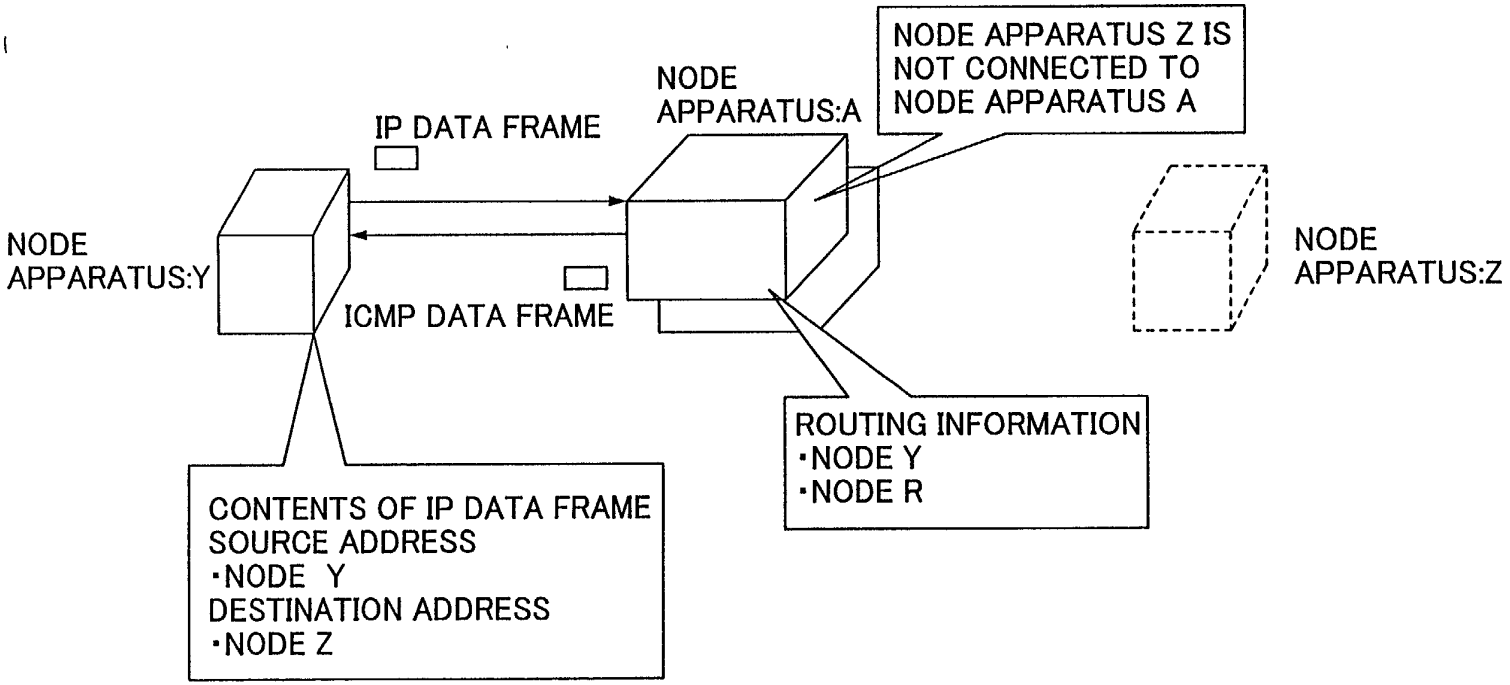


FIG.2

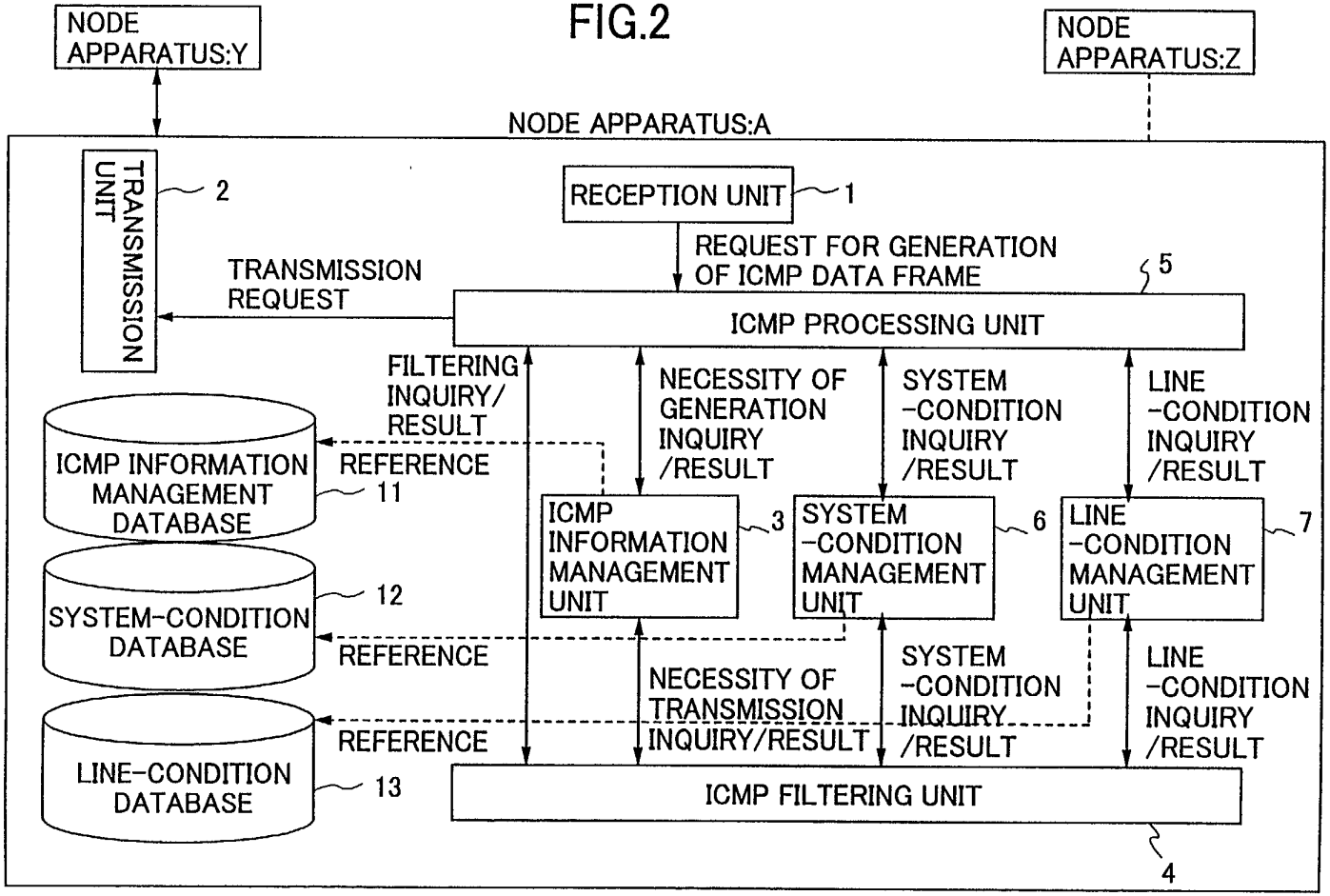

NODE APPARATUS:Y
NODE APPARATUS:Z
NODE APPARATUS:A
TRANSMISSION UNIT
2
RECEPTION UNIT
1
REQUEST FOR GENERATION OF ICMP DATA FRAME
5
TRANSMISSION REQUEST
ICMP PROCESSING UNIT
FILTERING INQUIRY/ RESULT
NECESSITY OF GENERATION INQUIRY /RESULT
SYSTEM -CONDITION INQUIRY /RESULT
LINE -CONDITION INQUIRY /RESULT
ICMP INFORMATION MANAGEMENT DATABASE
REFERENCE
11
ICMP INFORMATION MANAGEMENT UNIT
3
SYSTEM -CONDITION MANAGEMENT UNIT
6
LINE -CONDITION MANAGEMENT UNIT
7
SYSTEM-CONDITION DATABASE
12
REFERENCE
NECESSITY OF TRANSMISSION INQUIRY/RESULT
SYSTEM -CONDITION INQUIRY /RESULT
LINE -CONDITION INQUIRY /RESULT
REFERENCE
LINE-CONDITION DATABASE
13
ICMP FILTERING UNIT
4

FIG.3

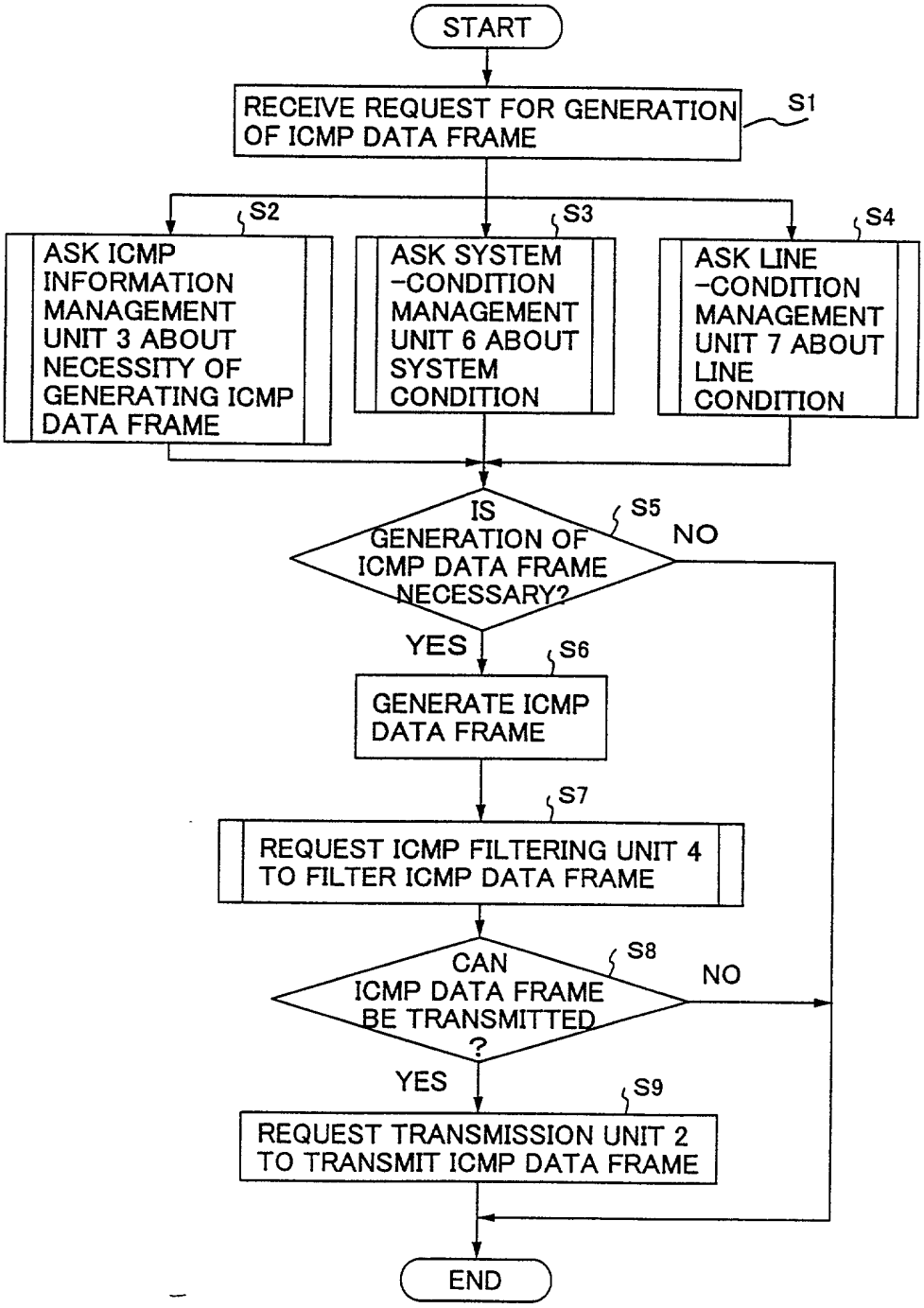

START
RECEIVE REQUEST FOR GENERATION OF ICMP DATA FRAME
S1
S2
ASK ICMP INFORMATION MANAGEMENT UNIT 3 ABOUT NECESSITY OF GENERATING ICMP DATA FRAME
S3
ASK SYSTEM -CONDITION MANAGEMENT UNIT 6 ABOUT SYSTEM CONDITION
S4
ASK LINE -CONDITION MANAGEMENT UNIT 7 ABOUT LINE CONDITION
IS GENERATION OF ICMP DATA FRAME NECESSARY?
S5
NO
YES
S6
GENERATE ICMP DATA FRAME
S7
REQUEST ICMP FILTERING UNIT 4 TO FILTER ICMP DATA FRAME
CAN ICMP DATA FRAME BE TRANSMITTED ?
S8
NO
YES
S9
REQUEST TRANSMISSION UNIT 2 TO TRANSMIT ICMP DATA FRAME
END

FIG.4

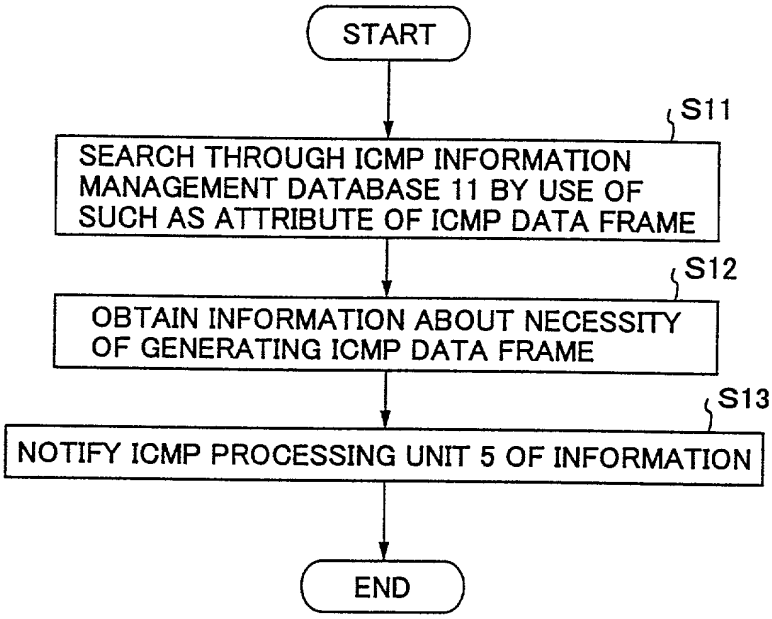

START
S11
SEARCH THROUGH ICMP INFORMATION MANAGEMENT DATABASE 11 BY USE OF SUCH AS ATTRIBUTE OF ICMP DATA FRAME
S12
OBTAIN INFORMATION ABOUT NECESSITY OF GENERATING ICMP DATA FRAME
S13
NOTIFY ICMP PROCESSING UNIT 5 OF INFORMATION
END

FIG.5

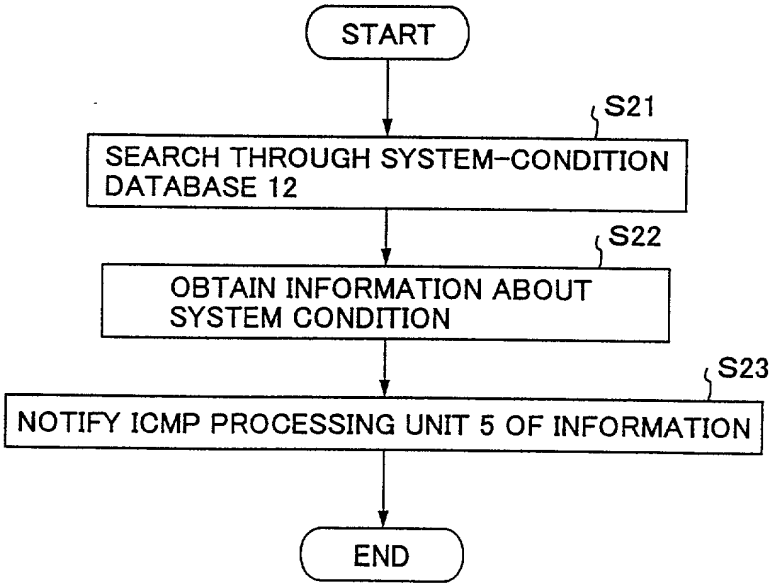

START
S21
SEARCH THROUGH SYSTEM-CONDITION DATABASE 12
S22
OBTAIN INFORMATION ABOUT SYSTEM CONDITION
S23
NOTIFY ICMP PROCESSING UNIT 5 OF INFORMATION
END

FIG.6

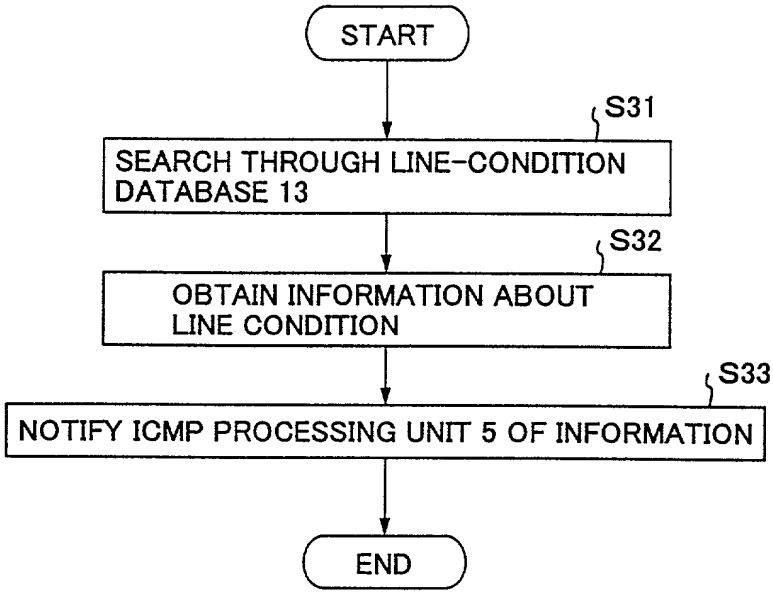

START
S31
SEARCH THROUGH LINE-CONDITION DATABASE 13
S32
OBTAIN INFORMATION ABOUT LINE CONDITION
S33
NOTIFY ICMP PROCESSING UNIT 5 OF INFORMATION
END

FIG.7

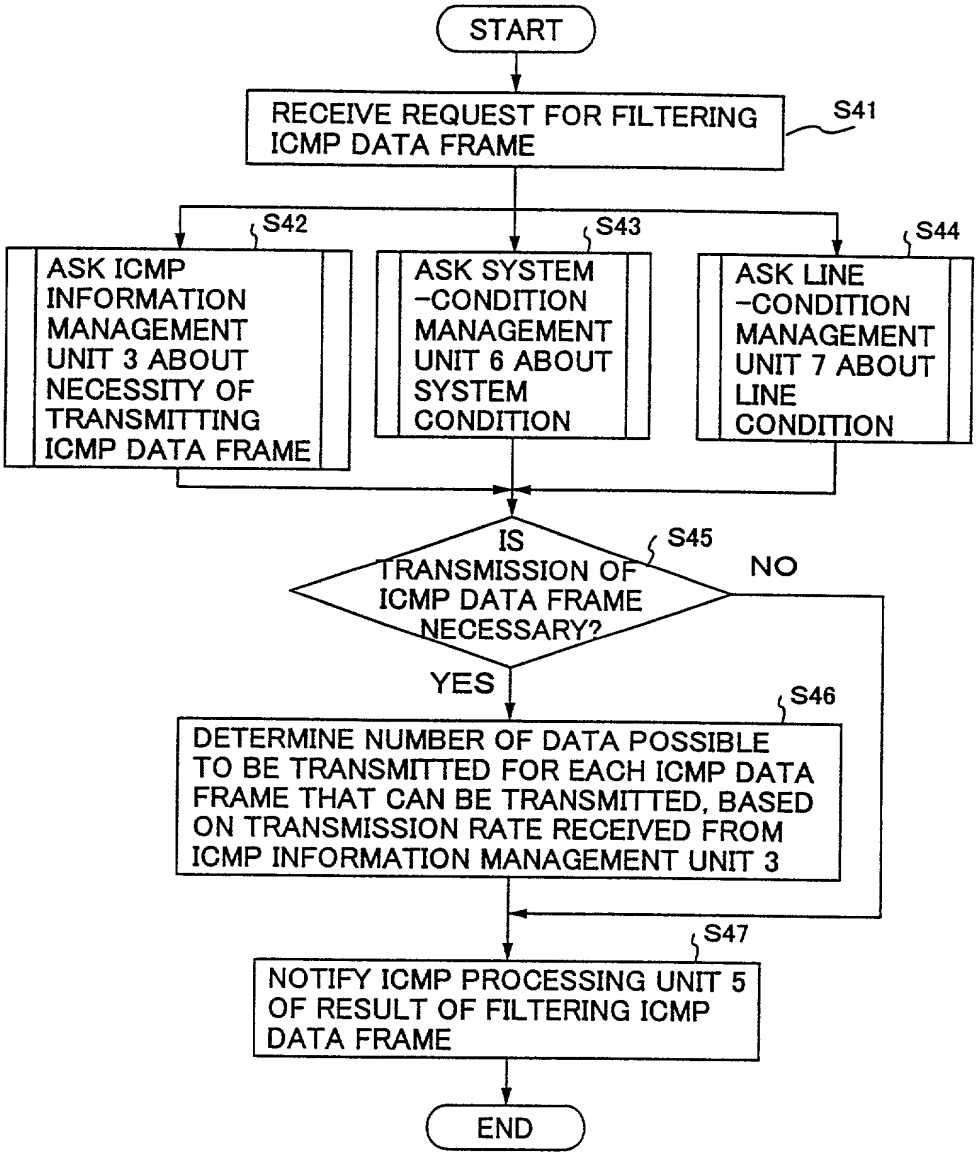

START
RECEIVE REQUEST FOR FILTERING ICMP DATA FRAME
S41
S42
S43
S44
ASK ICMP INFORMATION MANAGEMENT UNIT 3 ABOUT NECESSITY OF TRANSMITTING ICMP DATA FRAME
ASK SYSTEM -CONDITION MANAGEMENT UNIT 6 ABOUT SYSTEM CONDITION
ASK LINE -CONDITION MANAGEMENT UNIT 7 ABOUT LINE CONDITION
IS TRANSMISSION OF ICMP DATA FRAME NECESSARY?
S45
NO
YES
S46
DETERMINE NUMBER OF DATA POSSIBLE TO BE TRANSMITTED FOR EACH ICMP DATA FRAME THAT CAN BE TRANSMITTED, BASED ON TRANSMISSION RATE RECEIVED FROM ICMP INFORMATION MANAGEMENT UNIT 3
S47
NOTIFY ICMP PROCESSING UNIT 5 OF RESULT OF FILTERING ICMP DATA FRAME
END

FIG.8

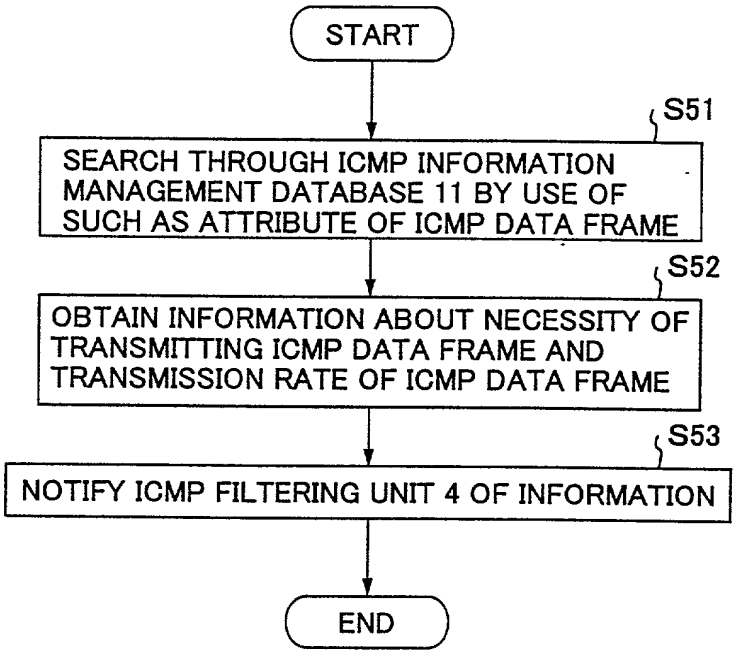

START
S51
SEARCH THROUGH ICMP INFORMATION MANAGEMENT DATABASE 11 BY USE OF SUCH AS ATTRIBUTE OF ICMP DATA FRAME
S52
OBTAIN INFORMATION ABOUT NECESSITY OF TRANSMITTING ICMP DATA FRAME AND TRANSMISSION RATE OF ICMP DATA FRAME
S53
NOTIFY ICMP FILTERING UNIT 4 OF INFORMATION
END

FIG.9

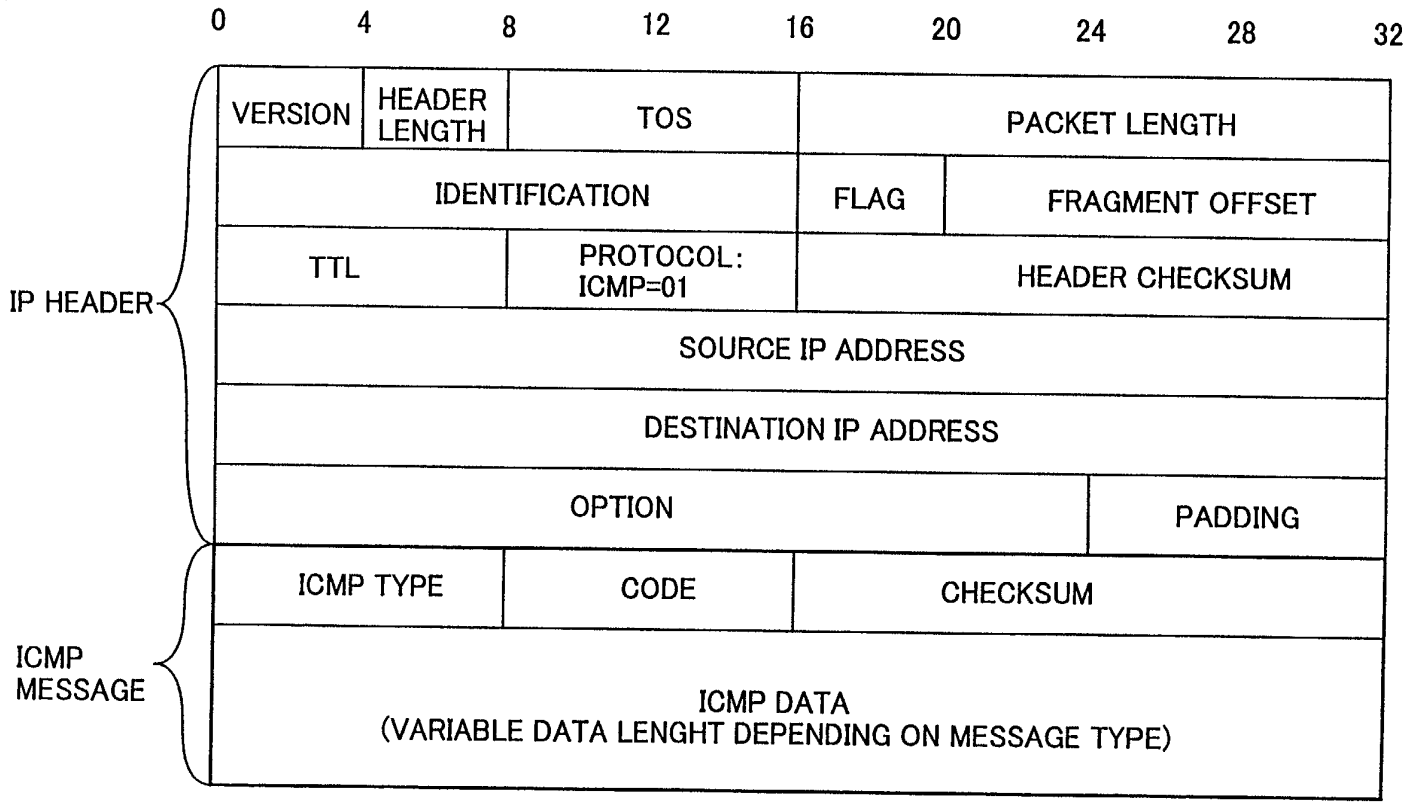

0
4
8
12
16
20
24
28
32
VERSION
HEADER LENGTH
TOS
PACKET LENGTH
IDENTIFICATION
FLAG
FRAGMENT OFFSET
TTL
PROTOCOL: ICMP=01
HEADER CHECKSUM
SOURCE IP ADDRESS
DESTINATION IP ADDRESS
OPTION
PADDING
IP HEADER
ICMP TYPE
CODE
CHECKSUM
ICMP DATA
(VARIABLE DATA LENGHT DEPENDING ON MESSAGE TYPE)
ICMP MESSAGE

FIG.10

TYPE OF ICMP DATA FRAME (HEXADECIMAL NUMBER)	CONTENTS OF TYPE	CODE OF ICMP DATA FRAME (HEXADECIMAL NUMBER)	CONTENS OF CODE	NECESSITY OF GENERATING ICMP DATA FRAME	NECESSITY OF TRANSMITT -ING ICMP DATA FRAME	TRANS -MISION RATE OF ICMP DATA FRAME
03	UNABLE TO REACH DESTINATION	00	UNABLE TO REACH NETWORK	YES	YES	10%
		01	UNABLE TO REACH HOST	YES	YES	50%
		02	UNABLE TO REACH PROTOCOL	YES	YES	50%
		03	UNABLE TO REACH PORT	YES	YES	60%
		⋮	⋮			
04	RESTRAIN TRANSMISSION	——	RESTRAIN TRANSMISSION	NO	NO	0%
05	CHANGE ROUTE	00	CHANGE NETWORK ROUTE	YES	YES	20%
		01	CHANGE HOST ROUTE	YES	YES	30%
		02	CHANGE TOS AND NETWORK	YES	YES	9%
		03	CHANGE TOS AND HOST	YES	YES	90%
≈ ⋮		⋮			⋮	≈
08	REQUEST FOR ECHO		REQUEST FOR ECHO			0%

FIG.11

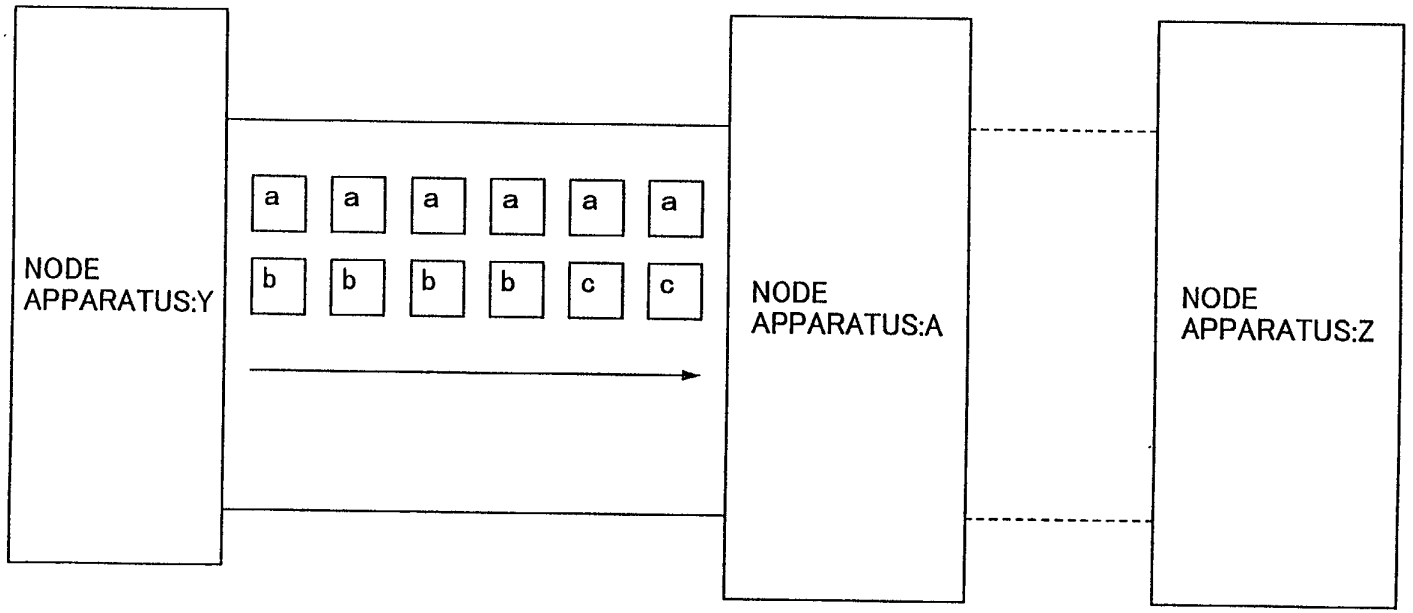
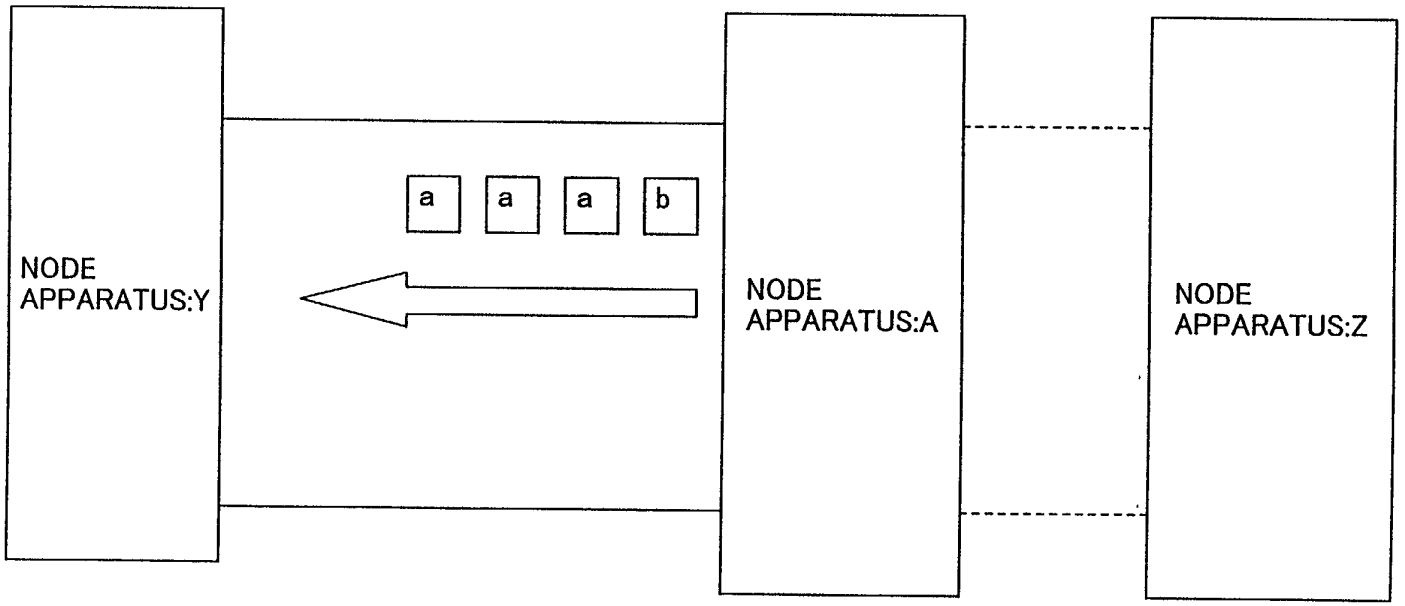

NODE
APPARATUS:Y
a
a
a
a
a
a
b
b
b
b
c
c
NODE
APPARATUS:A
NODE
APPARATUS:Z

FIG.12



PCT/JP2003/002847

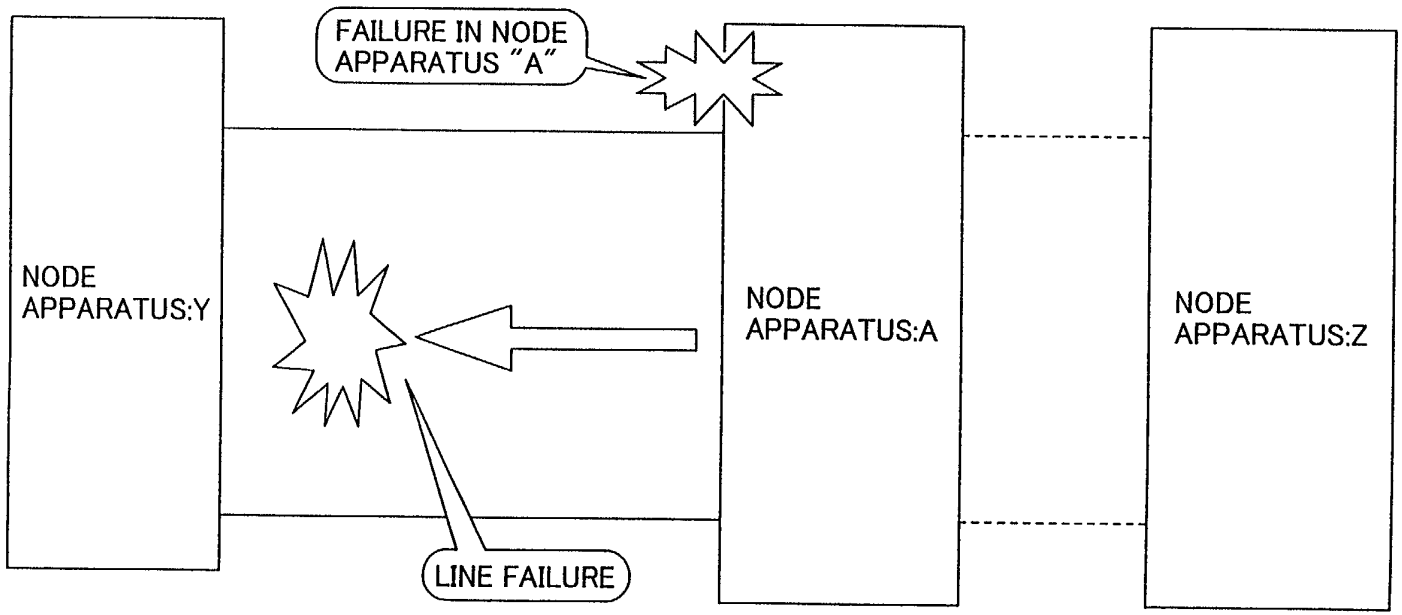



FIG.13